

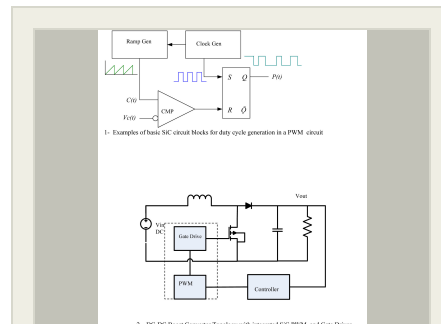
Extreme Environment Circuit Blocks for Spacecraft Power & Propulsion System & Other High Reliability Applications, Phase I

Completed Technology Project (2013 - 2013)



Project Introduction

Chronos Technology (the R&D division of Frequency Management International, FMI) proposes to deliver a comprehensive, and fully investigated & validated feasibility study (in Phase 1) for a novel approach leading to design & fabrication of extreme Environment Silicon Carbide (SiC) circuit blocks used in a variety of spacecraft power & propulsion system. The circuits shall be used for a wide range of both manned and unmanned space missions. The resulting solutions uniquely enable new extreme environment and high temperature performance levels offered commercially in compact, miniature size & rugged construction. There are no present alternatives for the proposed devices applicable to the extreme environment operating conditions. Based on the technology selection investigation and the road map defined, our proposed technology investigation and the resulting design effort in phase 1 shall conclude with identifying the best fit semiconductor fabrication process as well as component level design & implementation/fabrication methodology plan. With the already stated interest from SiC processing companies such as Cree, we would be focused on targeting device designs for circuits like counter, basic gate, buffer/driver & amplifier, all operating at industry std low voltages. In phase 2, we will complete the design/fabrication of successful extreme environment integrated circuit blocks as described that will be used in high efficiency spacecraft power & propulsion systems. We envision to deliver devices that will enable high efficiency power management as well as much improvement in energy density and specific power as required for the state of the art modular power unit architecture. Coupled with the extreme environment, high temperature operation and radiation hardened capabilities the resulting innovative devices will play its significant role as part of the emerging power and propulsion system for future missions.



Extreme Environment Circuit Blocks for Spacecraft Power & Propulsion System & Other High Reliability Applications

Table of Contents

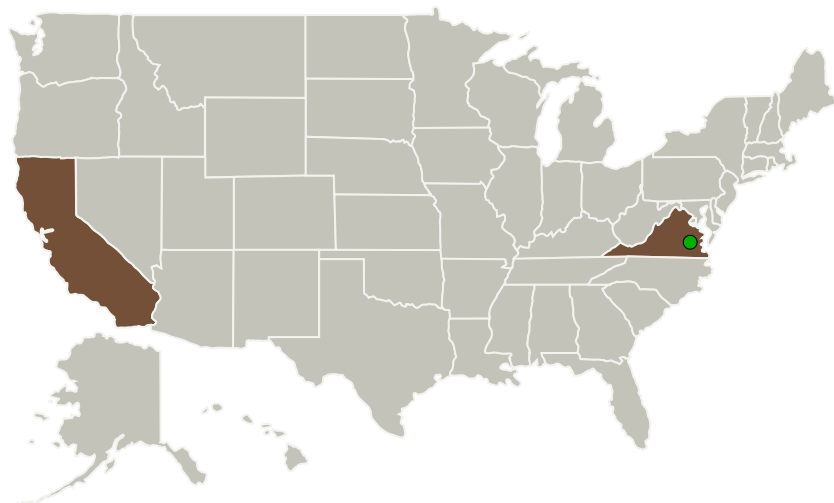
Project Introduction	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destinations	3

Extreme Environment Circuit Blocks for Spacecraft Power & Propulsion System & Other High Reliability Applications, Phase I

Completed Technology Project (2013 - 2013)



Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

**May 2013:** Project Start**November 2013:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140381>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

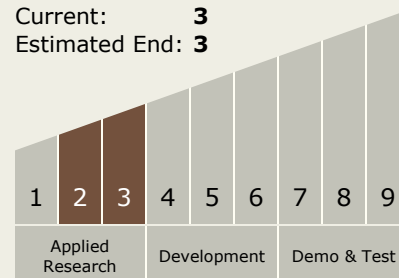
Kouros - Sariri

Co-Investigator:

Kouros Sariri

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3

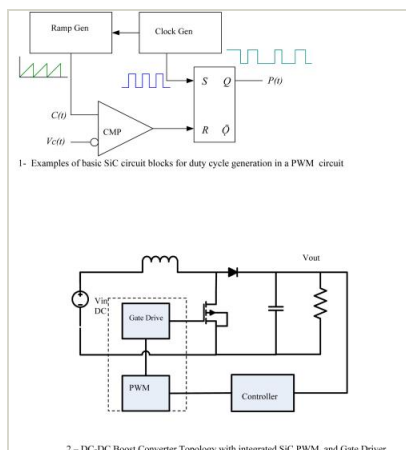


Extreme Environment Circuit Blocks for Spacecraft Power & Propulsion System & Other High Reliability Applications, Phase I

Completed Technology Project (2013 - 2013)



Images



Project Image

Extreme Environment Circuit Blocks for Spacecraft Power & Propulsion System & Other High Reliability Applications

(<https://techport.nasa.gov/image/127193>)

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.2 Electric Space Propulsion
 - └ TX01.2.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System